MYCOTAXON

Volume 109, pp. 307–313 *July–September 2009*

Oxyporus piceicola sp. nov. with a key to species of the genus in China

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Abstract — *Oxyporus piceicola* is new to science, and it is described, illustrated and compared with similar species in this paper. It differs from other species in the genus in its annual and resupinate basidiocarps, thick-walled and apically encrusted cystidia, distinctly ellipsoid and thin-walled basidiospores, and in its growth on *Pice*a exclusively. Fifteen polypores of *Oxyporus* have been found in China, and a key to the Chinese species of *Oxyporus* is provided with a statistical variation of spore dimensions.

Key words — *Basidiomycota,* lignicolous and poroid fungi, taxonomy

Introduction

Oxyporus (Bourdot & Galzin) Donk is characterized by having white or cream-coloured tubes, a monomitic hyphal structure with simple septate and cyanophilous generative hyphae, presence of cystidia in most species. Basidiospores in the genus are hyaline, thin- to slightly thick-walled, negative in both Melzer's reagent and Cotton Blue, and all species in the genus cause a white rot (Gilbertson & Ryvarden 1987, Núñez & Ryvarden 2001, Ryvarden & Gilbertson 1994).

Diversity of poroid fungi has been investigated intensively from western China recently (Cui et al. 2008, Dai & Yang 2008, Dai et al. 2007a,b,c, 2008). During a survey of the wood-rotting fungi in this area, two specimens of a polypore collected on stump of *Picea* showed morphology not described before. The basidiocarps are annual and resupinate, have abundant thick-walled and apically encrusted cystidia and a monomitic hyphal structure with

simple septate generative hyphae. The basidiospores are distinctly ellipsoid, hyaline and thin-walled. These characters suggest it as a new species in the genus *Oxyporus*.

Materials and methods

The studied specimens are deposited at the herbarium of Beijing Forestry University (BJFC), and the herbarium of Institute of Applied Ecology, Chinese Academy of Sciences (IFP). Sections were studied at magnification up to ×1000 by using a Nikon Eclipse E80i microscope and phase contrast illumination. Drawings were made with the aid of a drawing tube. The microscopic routine used in the study is as presented by Cui et al. (2009). Microscopic features, measurements, and drawings were made from slide preparations stained with Cotton Blue and Melzer's reagent. Spores were measured from sections cut of the tubes. In presenting the variation in the size of the spores, 5% of measurements were excluded from each end of the range and were given in parentheses. In the text the following abbreviations are used: IKI = Melzer's reagent, IKI– = negative in Melzer's reagent, KOH = 5% potassium hydroxide, CB = Cotton Blue, CB+ = cyanophilous, CB– = acyanophilous, L = mean spore length (arithmetic average of all spores), W = mean spore width (arithmetic average of all spores), Q = variation in the L/W ratios between the specimens studied, n = number of spores measured from given number of specimens. Special colour terms follow Petersen (1996) and Anonymous (1969).

Description

Oxyporus piceicola B.K. Cui & Y.C. Dai, **sp. nov.** Fig. 1

Mycobank MB 513407

Carpophorum annuum, resupinatum, contextum cremeum. Facies pororum cremea vel mellea; pori rotundi, 4–6 per mm. Systema hypharum monomiticum, hyphae septatae sine fibulis, hyphae subiculi 2.5–4.5 µm in diam. Cystidiae clavata, incrustata, Sporae pallidae, ellipsoideae, 4.6–5.3 × 3–3.6 µm.

Type. — China. Qinghai Prov., Huzhu County, Beishan Forest Park, on stump of Picea, 31.VIII.2003 Dai 5033 (**holotype** in IFP, isotype in BJFC).

Etymology — *piceicola* (Lat.): referring to the tree genus *Picea*.

Fruitbody — Basidiocarps annual, resupinate, soft corky to fragile when dry, pore surface cream to cinnamon buff when dry, up to 3 m long, 2 cm wide, and 1 mm thick. Sterile margin narrow, pale cream, up to 1 mm wide. Pores round, 4–6 per mm, dissepiments thin, lacerate. Subiculum very thin to almost lacking, less than 0.1 mm thick, cream and soft corky when dry. Tube layer concolorous with pore surface, brittle when dry, tubes up to 0.9 mm long.

Hyphal structure — Hyphal system monomitic, hyphae simple septate, IKI–, CB+, tissue unchanged in KOH.

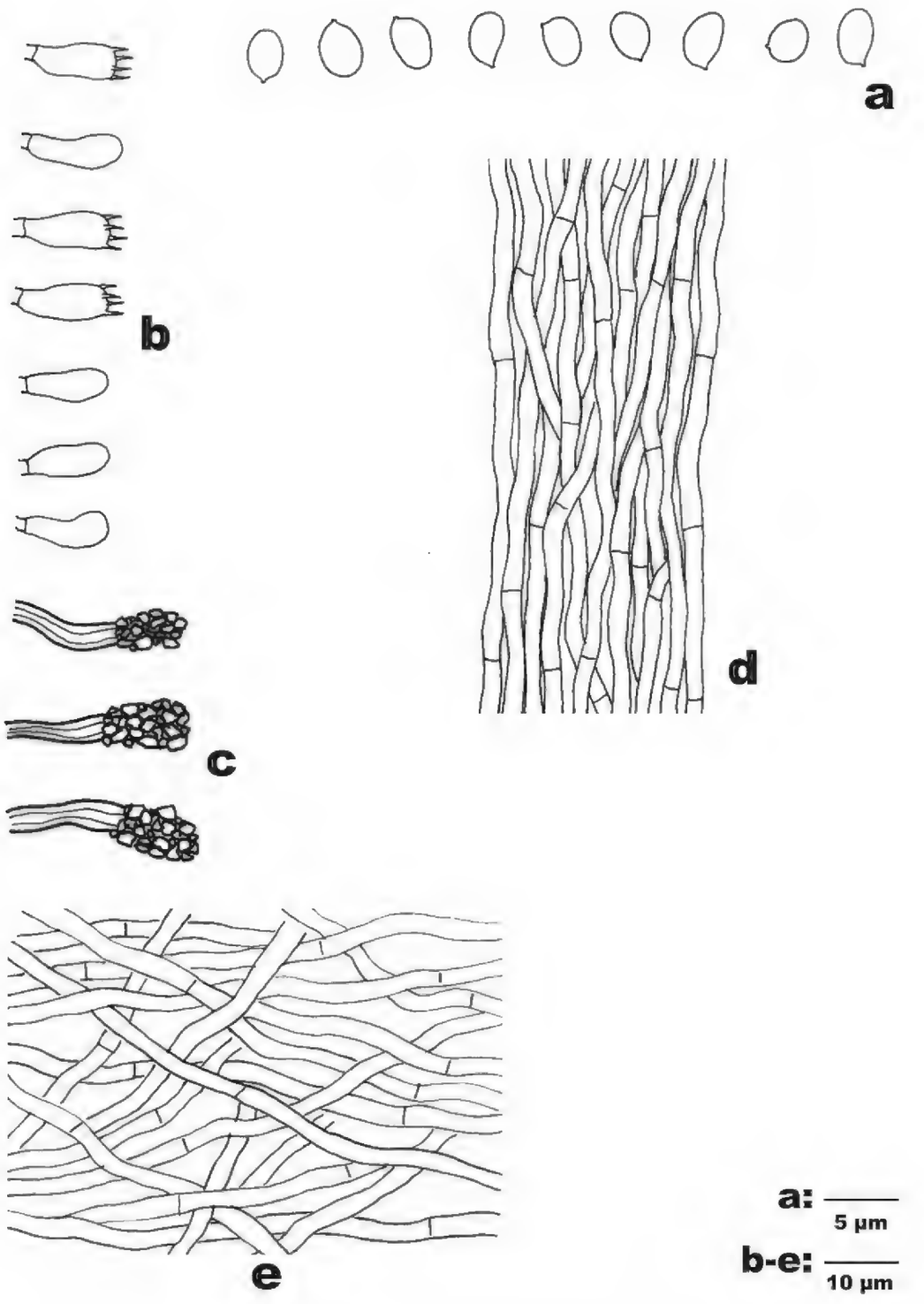

Fig. 1. Microscopic structures of *Oxyporus piceicola* (drawn from the holotype). —a: Basidiospores. —b: Basidia and basidioles. —c: Cystidia. —d: Hyphae from tube. —e: Hyphae from subiculum.

Subiculum — Subicular hyphae hyaline, thin- to slightly thick-walled with a wide lumen, frequently simple septate, occasionally branched, more or less flexuous, loosely interwoven, 2.5–4.5 µm in diam.

Tubes — Tramal hyphae hyaline, thin- to slightly thick-walled with a wide lumen, frequently simple septate, rarely branched, more or less straight, subparallel along the tubes, usually covered by irregular crystals, 2–4 μm in diam. Cystidia present, clavate, thin- to thick-walled, apically encrusted, arising from tramal hyphae, 30–48 × 5–7 μm. Basidia clavate, with four sterigmata and a basal simple septum, 13–22 × 5–6 μm, basidioles mostly barrel-shaped, slightly smaller than basidia.

Spores — Basidiospores ellipsoid, hyaline, thin-walled, smooth, usually bearing a small guttule, IKI–, CB–, (4.5–)4.6–5.3(–5.5) × (2.9–)3–3.6(–3.7) μm, L=4.95 μm, W=3.27 μm, Q=1.5–1.53 (n=90/3).

Additional specimen examined — **China.** Sichuan Prov., Jiuzhaigou County, Huanglong Nature Reserve, on stump of *Picea*, 15.X.2002 Dai 4232 (IFP, BJFC).

Type of rot — White rot.

Discussion

Oxyporus piceicola is characterized by annual and resupinate basidiocarps, thick-walled and apically encrusted cystidia, distinctly ellipsoid and thin-walled basidiospores, and by exclusive growth on *Picea. Oxyporus subpopulinus* B.K. Cui & Y.C. Dai, also described from western China and found on *Picea*, is distinguished from *O. piceicola* in having perennial basidiocarps and smaller (3.4–4.7 × 2.3–3.2 μm) basidiospores (Cui et al. 2006).

Oxyporus obducens (Pers.) Donk has annual and resupinate basidiocarps, similar pores (4–6 per mm), abundant thick-walled and encrusted cystidia, and ellipsoid basidiospores. However, it grows on angiosperm wood, and its basidiospores are less than 4.6 μm in length.

Oxyporus corticola (Fr.) Ryvarden, which has resupinate basidiocarps and may grow on *Picea,* differs from *O. piceicola* in having larger (2–4 per mm) pores and bigger (5–7 × 3–4.5 μm) basidiospores (Núñez & Ryvarden 2001).

Thirteen species of *Oxyporus* were reported from China previously (Zhao & Zhang 1992, Dai 1998, Dai et al. 2004, Dai & Wang 2005, Yu et al. 2005, Cui et al. 2006). The diagnostic key to Chinese *Oxyporus* species given below provides statistical variations of spore dimensions for each species.

Key to species of *Oxyporus* in China

(spore dimensions are given after species names)

1. Pore surface yellowish, spores cylindrical ..... *O. cervinogilvus* (Jungh.) Ryvarden
(5.8–)6.1–7.3(–9) × (2.8–)3–3.5(–3.6) μm,
L=6.89 μm, W=3.09 μm, Q=2.12–2.25 (n=60/2)

1. Pores surface white or cream, spores ellipsoid or subglobose 2

2. Basidiocarps distinctly pileate 3

2. Basidiocarps resupinate 7

3. Cystidia thin-walled, arising from subhymenium, contextual hyphae rarely septate ..... *O. bucholtzii* (Bondartsev & Ljub.) Y.C. Dai & Niemelä
(4–)5.2–6.2(–6.5) × (3–)3.5–4.1(–4.5) µm,
L=5.68 µm, W=3.9 µm, Q=1.47–1.48 (n=60/2)

3. Cystidia thick-walled, originating from trama, contextual hyphae frequently septate 4

4. Basidiocarps annual, pores 3–4 per mm ..... *O. cuneatus* (Murrill) Aoshima
(3.7–)4–4.8(–5) × (2.7–)2.9–3.7(–4) µm,
L=4.21 µm, W=3.19 µm, Q=1.26–1.38 (n=60/2)

4. Basidiocarps perennial, pores 4–8 per mm 5

5. Pores 4–5 per mm, spores > 5 µm in length ..... *O. sinensis* X.L. Zeng
(4.7–)5.2–6.6(–7) × (3.8–)4–5(–6) µm,
L=5.89 µm, W=4.54 µm, Q=1.25–1.36 (n=120/4)

5. Pores 5–8 per mm, spores < 5 µm in length 6

6. Spores subglobose, grow mostly on *Acer* ..... *O. populinus* (Schumach.) Donk
(3–)3.3–4.3(–4.4) × (2.9–)3–3.7(–3.9) µm,
L=3.79 µm, W=3.29 µm, Q=1.14–1.17 (n=98/3)

6. Spores ellipsoid, grow mostly on *Picea* ..... *O. subpopulinus*
(3–)3.4–4.7(–5) × (2.1–)2.3–3.2(–3.5) µm,
L = 3.92 µm, W = 2.88 µm, Q = 1.32–1.41 (n=180/6)

7. Cystidia absent ..... *O. ginkgonis* Y.C. Dai
(4.8–)4.9–6(–6.5) × (3.9–)4.1–5(–5.2) µm,
L=5.3 µm, W=4.57 µm, Q=1.08–1.22 (n=90/3)

7. Cystidia present 8

8. Basidiocarps perennial, basidiospores > 7 µm in length ..... *O. macroporus* Y.C. Dai & Y.L. Wei
(6.2–)7–8(–9) × (3.4–)3.5–4.1(–4.2) µm,
L=7.37 µm, W=3.85 µm, Q=1.92 (n=30/1)

8. Basidiocarps annual, basidiospores < 7 µm in length 9

9. Cystidia subulate ..... *O. subulatus* Ryvarden
(4.1–)4.3–5(–5.1) × (2.4–)2.5–3.2(–3.3) µm,
L=4.58 µm, W=2.78 µm, Q=1.58–1.72 (n=60/2)

9. Cystidia clavate 10

10. Pores 4–6 per mm, hyphoid cystidia arising from trama 11

10. Pores 1–4 per mm, hymenial cystidia originating from subhymenium 12

11. On angiosperm wood; basidiospores < 4.6 µm in length ..... *O. obducens*
(3.3–)3.5–4.6(–5) × (2.5–)2.7–3.5(–3.8) µm,
L=4.08 µm, W=3.1 µm, Q=1.26–1.38 (n=60/2)

11. On gymnosperm wood; basidiospores > 4.6 µm in length ..... *O. piceicola*
(4.5–)4.6–5.3(–5.5) × (2.9–)3–3.6(–3.7) µm,
L=4.95 µm, W=3.27 µm, Q=1.5–1.53 (n=60/2)

12. Spores subglobose 13

12. Spores broadly ellipsoid 14

13. On gymnosperm; spores < 4 µm in width ..... *O. cuneatus*
(3.7–)4–4.8(–5) × (2.7–)2.9–3.7(–4) µm,
L=4.21 µm, W=3.19 µm, Q=1.26–1.38 (n=60/2)

13. On angiosperm; spores > 4 µm in width ..... *O. philadelphi* (Parmasto) Ryvarden
(4.6–)4.8–5.2(–5.3) × (3.7–)3.8–4.8(–4.9) µm,
L=5.01 µm, W=4.39 µm, Q=1.14 (n=30/1)

14. Encrusted and smooth cystidia present, subicular hyphae 3–5 µm in diam
..... *O. corticola*
(4.5–)4.9–6.2(–7) × (2.9–)3–4(–4.1) µm,
L=5.53 µm, W=3.37 µm, Q=1.60–1.74 (n=120/4)

14. Only encrusted cystidia present, subicular hyphae 5–7 µm in diam
..... *O. latemarginatus* (Durieu & Mont.) Donk
(4.8–)5–8.5(–9) × (2.9–)3–3.7(–4) µm,
L=5.76 µm, W=3.31 µm, Q=1.65–1.79 (n=60/2)

Acknowledgements

Special thanks are due to Dr. Hai-Sheng Yuan (Shenyang, China) for technical assistance with the drawings. We express our gratitude to Drs. Zheng Wang (Yale University, USA) and Wjacheslav A. Spirin (St. Petersburg, Russia) who reviewed the manuscript. The research was financed by the National Natural Science Foundation of China (Project No. 30670009 and 30771730) and the Ministry of Science and Technology of P.R. China (Project No. 2008BADB0B03 and 2007AA021506).

Literature cited

Anonymous, 1969. Flora of British fungi. Colour identification chart. Her Majesty's Stationery Office, London

Cui BK, Huang MY, Dai YC. 2006. A new species of *Oxyporus* (*Basidiomycota*) from western China. Mycotaxon 96: 207–210.

Cui BK, Dai YC, Li BD. 2009. Notes on the genus *Rigidoporus* (*Basidiomycota, Polyporaceae*) in China. Nova Hedwigia 88: 189–197.

Cui BK, Wang Z, Dai YC. 2008. *Albatrellus piceiphilus sp. nov.* on the basis of morphological and molecular characters. Fungal Diversity: 28: 41–48.

Dai YC. 1998. Changbai wood-rotting fungi 9. Three new species and other species in *Rigidoporus, Skeletocutis* and *Wolfiporia* (*Basidiomycota, Aphyllophorales*). Annales Botanici Fennici 35: 143–154.

Dai YC, Cui BK, Decock C. 2008. A new species of *Fomitiporia* (*Hymenochaetaceae, Basidiomycota*) from China based on morphological and molecular characters. Mycological Research, 112: 375–380.

Dai YC, Cui BK, Yuan HS. 2007a. Notes on polypores from Gansu and Qinghai Province, northwest China. Cryptogamie Mycologie 28: 177–187.

Dai YC, Cui BK, Yuan HS, Li BD. 2007b. Pathogenic wood-decaying fungi in China Forest Pathology 37: 105–120.

Dai YC, Wang Z. 2005. A new polypore on *Ginkgo* from China. Mycotaxon 92: 345–349.

Dai YC, Wei YL, Wang Z. 2004. Wood-inhabiting fungi in southern China 2. Polypores from Sichuan Province. Annales Botanici Fennici 41: 319–329.

Dai YC, Wei YL, Yuan HS, Huang MY, Penzina T. 2007c. Polypores from Altay and Tian Mts. in Xinjiang, northwest China. Cryptogamie Mycologie 28: 269–279.

Dai YC, Yang F. 2008. A new species of *Phellinus* (*Basidiomycota*, *Hymenochaetales*) from western China. Mycotaxon 104: 103–106.

Gilbertson RL, Ryvarden L. 1987. North American polypores 2. *Megasporoporia - Wrightoporia*. Fungiflora, Oslo. pp. 434–885.

Núñez M, Ryvarden L. 2001. East Asian polypores 2. *Polyporaceae s. lato*. Syn. Fungorum 14: 165–522.

Petersen JH. 1996. Farvekort. The Danish Mycological Society´s colour-chart. Foreningen til Svampekundskabens Fremme, Greve.

Ryvarden L, Gilbertson RL. 1994. European polypores 2. Syn. Fungorum 7: 394–743.

Yu CJ, Zuo L, Dai YC. 2005. Three polypores from Xizang new to China. Fungal Science 20: 61–68.

Zhao JD, Zhang XQ. 1992. The polypores of China. Bibliotheca Mycologica 145: 1–524.